

# (12) United States Patent

## Shih et al.

### (54) LOW COST WINDOW PRODUCTION FOR HERMETICALLY SEALED OPTICAL **PACKAGES**

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#### (57)ABSTRACT

Disclosed embodiments demonstrate batch processing methods for producing optical windows for microdevices. The windows protect the active elements of the microdevice from contaminants, while allowing light to pass into and out of the hermetically sealed microdevice package. Windows may be batch produced, reducing the cost of production, by fusing multiple metal frames to a single sheet of glass. In order to allow windows to be welded atop packages, disclosed embodiments keep a lip of metal without any glass after the metal frames are fused to the sheet of glass. Several techniques may accomplish this goal, including grinding grooves in the glass to provide a gap that prevents fusion of the glass to the metal frames along the outside edges in order to form a lip. The disclosed batch processing techniques may allow for more efficient window production, taking advantage of the economy of scale.

#### 6 Claims, 3 Drawing Sheets

